

## **AMENDMENTS TO THE CLAIMS**

The following listing of claims will replace all prior versions and listings of claims in the application.

### **LISTING OF CLAIMS**

1. (Allowed) An antenna having improved radio frequency (RF) transmission and reception capabilities, comprising:
  - a main reflector;
  - an antenna element;
  - a support tube disposed at said axial center of said main reflector for supporting said antenna element in facing relationship to said main reflector, said support tube having a plurality of apertures therein and  
said apertures in said support tube serving to effectively reduce a dielectric constant of said support tube to thereby improve a signal strength of RF signals received by or transmitted from said antenna.
2. (Allowed) The antenna of Claim 1, wherein said antenna element comprises a parabolic shaped sub-reflector, said sub-reflector aligned with said axial center of said main reflector.

3. (Allowed) The antenna of Claim 2, wherein said antenna includes a waveguide at an axial center of said main reflector.

4. (Allowed) The antenna of Claim 1, wherein said antenna element comprises a patch antenna, said patch antenna being able to relay RF signals to an input connector through a coaxial feed cable.

5. (Allowed) The antenna of Claim 1, wherein said apertures in said support tube are arranged in a plurality of columns circumferentially about said support tube.

6. (Allowed) The antenna of Claim 1, further comprising a support tube end cap for covering one end of said support tube.

7. (Allowed) The antenna of Claim 1, wherein said main reflector comprises a hyperbolic shaped main reflector.

8. (Allowed) The antenna of Claim 1, wherein said support tube includes a plurality of circular apertures.

9. (Allowed) The antenna of Claim 1, wherein said support tube comprises a plurality of radial slots.

10. (Allowed) The antenna of Claim 1, wherein said support tube comprises a plurality of longitudinal slots.

11. (Allowed) The antenna of Claim 1, wherein said support tube comprises a plurality of differing slot shapes formed therein.

12. (Allowed) The antenna of Claim 1, wherein said support tube comprises a plurality of differing hole shapes formed therein.

13. (Allowed) The antenna of Claim 1, wherein said support tube comprises a metallic material.

14. (Allowed) The antenna of Claim 13, wherein said metallic support tube functions as at least one of a spatial filter and a frequency selective surface.

15. (Allowed) A method for producing an antenna having improved transmission and reception characteristics comprising:

providing a main reflector;

disposing an antenna element in front of said main reflector and coaxially aligned with an axial center of said main reflector so as to face said main reflector; and

mounting said antenna element on a support tube having a plurality of openings formed therein so that radio frequency signals may pass more freely through the support tube without being reflected therefrom.

16. (Allowed) The method of Claim 15, wherein the step of mounting said antenna element on a support tube comprises mounting said antenna element on a support tube having a plurality of circular apertures arranged in columns about the support tube.

17. (Allowed) The method of Claim 15, wherein the step of disposing an antenna element comprises disposing a sub-reflector in front of said main reflector.

18. (Allowed) The method of Claim 15, wherein the step of disposing an antenna element comprises disposing a patch antenna in front of said main reflector.

19. (Allowed) A method for producing an antenna having improved transmission and reception characteristics comprising:

- providing a main reflector;
- disposing a waveguide at an axial center of said main reflector;
- disposing a sub-reflector in front of said main reflector and coaxially aligned with an axial center of said main reflector so as to face said main reflector; and
- mounting said sub-reflector on a support tube having a plurality of openings, wherein the apertures are spaced generally uniformly around the support tube, so that radio frequency signals may pass more freely through the support tube without being reflected therefrom.

20. (Allowed) The method of Claim 19, wherein the step of providing a main reflector comprises providing a hyperbolic shaped main reflector.

21. (Allowed) The method of Claim 19, wherein the step of disposing a sub-reflector in front of said main reflector comprises disposing a parabolic shaped sub-reflector in front of said main reflector.

22. (Allowed) The method of Claim 19, wherein the step of mounting said sub-reflector comprises mounting said sub-reflector on a generally circular support tube, wherein said apertures are arranged in columns around said support tube.

23. (New) An antenna having improved transmission and reception capabilities, comprising:

a first antenna component;

a second antenna component; and

a support element operable to mount said second antenna component to said first antenna component such that said second antenna component is in facing relationship to said first antenna component, said support element having at least one aperture;

wherein said aperture reduces a dielectric constant of said support element to enhance antenna performance.

24. (New) The antenna of Claim 23, wherein said support element comprises a support tube.

25. (New) The antenna of Claim 23, wherein said second antenna component comprises a parabolic shaped sub-reflector aligned with an axial center of said first antenna component.

26. (New) The antenna of Claim 23, wherein said antenna includes a waveguide at an axial center of said first antenna component.

27. (New) The antenna of Claim 23, wherein:  
said first antenna component and said second antenna component  
comprise:  
a patch antenna, said patch antenna operable to relay signals to an input  
connector through a coaxial feed cable.

28. (New) The antenna of Claim 23, wherein said aperture comprises a plurality of apertures arranged in a plurality of columns circumferentially extending about said support element.

29. (New) The antenna of Claim 23, wherein said first antenna component comprises a hyperbolic shaped main reflector.

30. (New) The antenna of Claim 23, wherein said aperture comprises at least one circular aperture.

31. (New) The antenna of Claim 23, wherein said aperture comprises at least one longitudinal slot.

32. (New) The antenna of Claim 23, wherein said aperture comprises at least one elongated slot.

33. (New) The antenna of Claim 23, wherein said aperture comprises a plurality of apertures forming a plurality of differing shapes.

34. (New) The antenna of Claim 23, wherein said aperture comprises a plurality of apertures comprising a plurality of differing hole shapes.

35. (New) The antenna of Claim 23, wherein said support element comprises a metal tube.

36. (New) The antenna of Claim 23, wherein said support element functions as at least one of a spatial filter and a frequency selective surface.

37. (New) A method of producing an antenna having improved transmission and reception capabilities comprising:

- mounting a first antenna component to a second antenna component using a support element having an opening therein such that said first antenna component is supported in facing relationship to said second antenna component and spaced apart from said first component;

wherein said opening reduces a dielectric constant of said support element to thereby improve the antenna's performance.

38. (New) The method of Claim 37, wherein said mounting step further comprises mounting the first antenna component on a support element having a plurality of circular apertures arranged about the support element.

39. (New) The method of Claim 37, wherein said mounting step further comprises mounting the first antenna component to the second antenna component using a support tube.

40. (New) The method of Claim 37, wherein said mounting step further comprises mounting the first antenna component on a support element having a plurality of slits arranged about the support element.



41. (New) An antenna having improved transmission and reception capabilities comprising:

- a main reflector;
- a sub reflector aligned with an axial center of said main reflector;
- a support element operable to secure said sub reflector to said main reflector, said support element having at least one opening formed therein; and
- a waveguide positioned at said axial center of said main reflector;

wherein said opening reduces a dielectric constant of said support element.

42. (New) The antenna of Claim 41, wherein said support element is a support tube.

43. (New) The antenna of Claim 41, wherein said opening is a plurality of generally circular openings.

44. (New) The antenna of Claim 41, wherein said opening is a plurality of slots.

45. (New) The antenna of Claim 41, wherein said opening is a plurality of slots having approximately the same dimensions.